

PATENT

Attorney Docket No.: A-65353-7/RFT/RMS/RMK

Attorney File No. 468268-00013

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

MAYO et al.

Serial No. 09/827,960

Filed: April 4, 2001

For: *Apparatus and Method for Automated
Protein Design*

Examiner: KIM, Young J.

Art Unit: 1637

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence and listed enclosures are being hand-delivered to the Commissioner for Patents, ATTN: Young Kim, USPTO, Crystal Mall One, 7th Floor, 1911 South Clark Place, Arlington VA 22202, on the date listed below.

Date: _____

Signed: _____

**REQUEST TO USE COMPUTER READABLE FORM
OF SEQUENCE LISTING FROM ANOTHER APPLICATION**

Commissioner for Patents
Attn: Young Kim, Art Unit 1637
Crystal Mall One, 7th Floor
1911 South Clark Street
Arlington, VA 22202

Sir:

This request is submitted in order to place the specification in compliance with the rules for patent applications containing amino acid and/or nucleotide sequence disclosures, 37 C.F.R. §§ 1.821-1.825.

The paper copy of the Sequence Listing information in this application is identical to the computer readable copy of the Sequence Listing information filed in application Serial No. 09/127,926, filed on July 31, 1998 and issued as U.S. Patent 6,269,312 B1 on July 31, 2001, of which this application is a continuation application. In accordance with 37 C.F.R. 1.821(e), please use the only computer readable form of the sequence information filed in that application as the computer readable form for the instant application. It is understood that the Patent and Trademark Office will make the necessary changes in application number and

Serial No. 09/827,960

Filed: April 4, 2001

filing date for the instant application. A paper copy of the Sequence Listing is included herewith.

Please direct any calls in connection with this application to the undersigned at (415)-781-1989.

Respectfully submitted,

DORSEY & WHITNEY LLP

Dated: 7/25/03

BY: 

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SEQUENCE LISTING

<110> Mayo, Stephen L.
Dahiyat, Bassil L.
Gordon, D. Benjamin
Street, Arthur
Su, Yaoying

<120> Apparatus and Method for Automated Protein Design

<130> A65353-4/RFT/RMS/SJR

<140> 09/127,926

<141> 1998-07-31

<150> 60/043,464

<151> 1997-04-11

<150> 60/054,678

<151> 1997-08-04

<150> 60/061,097

<151> 1997-10-03

<150> 09/058,459

<151> 1998-04-10

<150> 60/087,561

<151> 1998-06-01

<160> 99

<170> PatentIn Ver. 2.1

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 Glu Leu Lys Lys Phe Ile Glu Lys Phe Lys Gly Arg
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 Glu Leu Gln Asp Phe Ile Glu Lys Phe Lys Gly Arg
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 Arg Leu Arg Asp Phe Ile Glu Lys Phe Lys Gly Arg
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 Glu Leu Lys Arg Phe Ile Glu Lys Phe Lys Gly Arg
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Glu Leu Lys Lys Phe Ile Glu Lys Phe Lys Gly Arg
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<400> 23
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1 5 10 15
Tyr His Leu Glu Asn Glu Val Ala Arg Leu Lys Lys Leu Val Gly Glu
20 25 30

Arg

<210> 24
<211> 33
<212> PRT
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Arg Met Lys Gln Leu Glu Asp Lys Val Glu Glu Leu Leu Ser Lys Asn
1 5 10 15
Tyr His Leu Glu Asn Glu Val Ala Arg Leu Lys Lys Leu Ala Gly Glu
20 25 30

Arg

<210> 25
<211> 33
<212> PRT
<213> yeast

<400> 25
Arg Met Lys Gln Leu Glu Asp Lys Val Glu Glu Leu Leu Ser Lys Asn
1 5 10 15
Tyr His Leu Glu Asn Glu Met Ala Arg Leu Lys Lys Leu Val Gly Glu
20 25 30

Arg

<210> 26
<211> 33
<212> PRT
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<400> 26
Arg Leu Lys Gln Met Glu Asp Lys Val Glu Glu Leu Leu Ser Lys Asn
1 5 10 15
Tyr His Leu Glu Asn Glu Val Ala Arg Leu Lys Lys Leu Val Gly Glu
20 25 30

Arg

<210> 27
<211> 33
<212> PRT
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<400> 27
Arg Leu Lys Gln Met Glu Asp Lys Val Glu Glu Leu Leu Ser Lys Asn
1 5 10 15
Tyr His Leu Glu Asn Glu Val Ala Arg Leu Lys Lys Leu Ala Gly Glu
20 25 30

Arg

<210> 28
<211> 33
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Arg Met Lys Gln Trp Glu Asp Lys Ala Glu Glu Leu Leu Ser Lys Asn
1 5 10 15
Tyr His Leu Glu Asn Glu Val Ala Arg Leu Lys Lys Leu Val Gly Glu
20 25 30

Arg

<210> 29
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<400> 29
Arg Met Lys Gln Phe Glu Asp Lys Val Glu Glu Leu Leu Ser Lys Asn
1 5 10 15

Tyr His Leu Glu Asn Glu Val Ala Arg Leu Lys Lys Leu Val Gly Glu
20 25 30

Arg

<210> 30
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<400> 30
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1 5 10 15

Tyr His Ala Glu Asn Glu Val Ala Arg Leu Lys Lys Leu Val Gly Glu
20 25 30

Arg

<210> 31
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<210> 38
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1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Val Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 39

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 39

Met Thr Trp Lys Tyr Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ile Val Asp Ala Ala Thr Phe Glu Lys Val Trp Lys Gln
20 25 30

Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Phe Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Leu Thr Ile Thr Glu
50 55

<210> 40

<211> 56

<212> PRT

<213> Streptococcus sp.

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1 5 10 15

Thr Thr Glu Ile Val Asp Ala Ala Thr Val Glu Lys Val Trp Lys Gln
20 25 30

Tyr Val Asn Asp Asn Gly Leu Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Ile Thr Glu
50 55

<210> 41

<211> 56

<212> PRT

<213> Streptococcus sp.

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1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

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35 40 45

Thr Lys Thr Trp Thr Ile Thr Glu
50 55

<210> 42
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1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Trp Thr Phe Thr Glu
50 55

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<213> Streptococcus sp.

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Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

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35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
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Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

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Thr Lys Thr Phe Thr Val Thr Glu

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			20					25					30		

Tyr	Ala	Asn	Asp	Asn	Gly	Ile	Asp	Gly	Glu	Trp	Thr	Tyr	Asp	Asp	Ala
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Thr	Lys	Thr	Phe	Thr	Val	Thr	Glu
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<211> 56

<212> PRT

<213> Streptococcus sp.

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1				5					10					15	

Thr	Thr	Glu	Ala	Val	Asp	Ala	Ala	Thr	Ala	Glu	Lys	Val	Phe	Lys	Gln
			20					25					30		

Tyr	Ala	Asn	Asp	Asn	Gly	Val	Asp	Gly	Glu	Trp	Thr	Tyr	Asp	Asp	Ala
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Thr	Lys	Thr	Phe	Thr	Val	Thr	Glu
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<212> PRT

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Thr	Thr	Glu	Ala	Val	Asp	Ala	Ala	Thr	Ala	Glu	Lys	Val	Ile	Lys	Gln
			20					25					30		

Tyr	Ala	Asn	Asp	Asn	Gly	Val	Asp	Gly	Glu	Trp	Thr	Tyr	Asp	Asp	Ala
		35					40						45		

Thr	Lys	Thr	Ile	Thr	Ile	Thr	Glu
	50					55	

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20 25 30
Tyr Ala Asn Asp Asn Gly Val Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45
Thr Lys Thr Ile Thr Ile Thr Glu
50 55

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Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Ala Lys Gln
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Tyr Ala Asn Asp Asn Gly Val Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45
Thr Lys Thr Leu Thr Val Thr Glu
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20 25 30
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35 40 45
Thr Lys Thr Trp Thr Phe Thr Glu
50 55

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Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
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35 40 45

Thr Lys Thr Trp Thr Phe Thr Glu
50 55

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<400> 52

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1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Phe Thr Glu
50 55

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<212> PRT

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<400> 53

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1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
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Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Phe Thr Glu
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<212> PRT

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<400> 54

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Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30

Tyr Leu Asn Asp Asn Gly Val Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45

Thr Lys Thr Trp Thr Phe Thr Glu
 50 55

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Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
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Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Val Thr Tyr Asp Asp Ala
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Thr Lys Thr Trp Thr Phe Thr Glu
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Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30

Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45

Thr Lys Thr Tyr Thr Phe Thr Glu
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<210> 57
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Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
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<400> 61
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 Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30
 Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Val Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Trp Thr Phe Thr Glu
 50 55

<210> 62
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 <212> PRT
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<400> 62
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 20 25 30
 Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Trp Thr Phe Thr Glu
 50 55

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<400> 63
 Met Thr Tyr Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15
 Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30
 Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Tyr Thr Phe Thr Glu
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<210> 64
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<400> 64

Met Thr Tyr Lys Leu Ile Val Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Tyr Thr Phe Thr Glu
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<400> 65

Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Ile Thr Glu
50 55

<210> 66

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 66

Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ile Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 67

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<212> PRT

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<400> 67

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 20 25 30
 Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Phe Thr Val Thr Glu
 50 55

<210> 68
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 68
 Met Thr Tyr Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15
 Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30
 Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Phe Thr Ile Thr Glu
 50 55

<210> 69
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 69
 Met Thr Tyr Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15
 Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30
 Tyr Ile Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Phe Thr Val Thr Glu
 50 55

<210> 70
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 70
 Met Thr Tyr Lys Ile Ile Phe Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15
 Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln

20 25 30
 Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
 50 55

<210> 71
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 71
 Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30

Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45

Thr Lys Thr Trp Thr Phe Thr Glu
 50 55

<210> 72
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 72
 Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30

Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Ile Thr Tyr Asp Asp Ala
 35 40 45

Thr Lys Thr Phe Thr Phe Thr Glu
 50 55

<210> 73
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 73
 Met Thr Tyr Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30

Tyr Ala Asn Asp Asn Gly Val Asp Gly Glu Ile Thr Tyr Asp Asp Ala
 35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 74
<211> 56
<212> PRT
<213> Streptococcus sp.

<400> 74
Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 75
<211> 56
<212> PRT
<213> Streptococcus sp.

<400> 75
Met Thr Tyr Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Trp Thr Phe Thr Glu
50 55

<210> 76
<211> 56
<212> PRT
<213> Streptococcus sp.

<400> 76
Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Trp Thr Ile Thr Glu
50 55

<210> 77
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 77
 Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15
 Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30
 Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Val Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Trp Thr Phe Thr Glu
 50 55

<210> 78
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 78
 Met Thr Tyr Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15
 Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30
 Tyr Leu Asn Asp Asn Gly Ile Asp Gly Glu Ile Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Phe Thr Phe Thr Glu
 50 55

<210> 79
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 79
 Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
 1 5 10 15
 Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
 20 25 30
 Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Tyr Thr Ile Thr Glu
 50 55

<210> 80
 <211> 56
 <212> PRT

<213> Streptococcus sp.

<400> 80

Met Thr Phe Lys Ile Ile Val Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Val Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 81

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 81

Met Thr Phe Lys Leu Ile Val Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 82

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 82

Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 83

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 83

Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr

1	5	10	15
Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln			
20	25	30	
Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala			
35	40	45	
Thr Lys Thr Trp Thr Val Thr Glu			
50	55		

<210> 84
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 84
Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15
Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30
Tyr Ile Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45
Thr Lys Thr Trp Thr Val Thr Glu
50 55

<210> 85
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 85
Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15
Thr Thr Glu Ala Val Asp Ala Ala Thr Leu Glu Lys Val Phe Lys Gln
20 25 30
Tyr Ile Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45
Thr Lys Thr Trp Thr Val Thr Glu
50 55

<210> 86
 <211> 56
 <212> PRT
 <213> Streptococcus sp.

<400> 86
Met Thr Ala Lys Ala Ile Ala Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15
Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Ala Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Leu Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Ala Thr Ala Thr Glu
50 55

<210> 87

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 87

Met Thr Phe Lys Ala Ile Ala Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Ala Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Leu Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Ala Thr Ala Thr Glu
50 55

<210> 88

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 88

Met Thr Phe Lys Ala Ile Val Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 89

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 89

Met Thr Phe Lys Leu Ile Val Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 90

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 90

Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 91

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 91

Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Trp Thr Val Thr Glu
50 55

<210> 92

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 92

Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Trp Thr Val Thr Glu
50 55

<210> 93
<211> 56
<212> PRT
<213> Streptococcus sp.

<400> 93
Met Thr Val Lys Leu Ile Val Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15
Thr Thr Glu Val Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30
Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45
Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 94
<211> 56
<212> PRT
<213> Streptococcus sp.

<400> 94
Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15
Thr Thr Glu Val Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30
Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45
Thr Lys Thr Phe Thr Val Thr Glu
50 55

<210> 95
<211> 56
<212> PRT
<213> Streptococcus sp.

<400> 95
Met Thr Phe Lys Leu Ile Ala Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15
Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30
Tyr Ala Asn Asp Asn Gly Leu Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45
Thr Lys Thr Trp Thr Val Thr Glu
50 55

<210> 96
<211> 56
<212> PRT
<213> Streptococcus sp.

<400> 96

Met Thr Phe Lys Leu Ile Leu Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Leu Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Trp Thr Ala Thr Glu
50 55

<210> 97

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 97

Met Thr Phe Lys Leu Ile Val Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Phe Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Trp Thr Val Thr Glu
50 55

<210> 98

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 98

Met Thr Phe Lys Leu Ile Ile Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Val Val Asp Ala Ala Thr Ala Glu Lys Val Trp Lys Gln
20 25 30

Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
35 40 45

Thr Lys Thr Leu Thr Val Thr Glu
50 55

<210> 99

<211> 56

<212> PRT

<213> Streptococcus sp.

<400> 99

Met Thr Phe Lys Leu Ile Val Asn Gly Lys Thr Leu Lys Gly Glu Thr
1 5 10 15

Thr Thr Glu Ala Val Asp Ala Ala Thr Ala Glu Lys Val Tyr Lys Gln
 20 25 30
 Tyr Ala Asn Asp Asn Gly Ile Asp Gly Glu Trp Thr Tyr Asp Asp Ala
 35 40 45
 Thr Lys Thr Trp Thr Val Thr Glu
 50 55